

What is claimed is:

1. A power trading risk management system, comprising:

5 an electricity procurement planning unit for producing an electricity procurement plan by combining electricity to be generated by one or plural owned power generators and electricity to be procured from a market;

10 10 producing a generation-procurement curve based on the electricity procurement plan;

15 a portfolio producing unit for producing a portfolio of electricity to be generated by owned power plants and electricity to be procured from a power trading market that is matching to the generation-procurement curve ;

a risk evaluation unit for evaluating a risk of the portfolio;

a profit estimating unit for estimating a profit of electricity sale according to the portfolio;

20 20 a portfolio reorganizing unit for reorganizing the portfolio;

25 a best portfolio proposing unit for judging a best portfolio which can maximize the profit while maintaining the risk in the profit of electricity sale in a certain period within a tolerance among the reorganized portfolios.

2. The power trading risk management system according to claim 1, further comprising:

30 means for deciding a combination of power generators to be operated to maximize a profit accrued from power

generation.

3. The power trading risk management system according to claim 1, further comprising:

an estimation of future electricity demand unit for
5 estimating fluctuations of future electricity demand according to past electricity demand fluctuations; and

an estimation of electricity price fluctuation unit for estimating future electricity price fluctuations according to the past electricity demands, past price 10 fluctuations and a relationship between electricity demand and price in a predetermined period as well as the estimated fluctuations of future electricity demand; and
the system wherein

the portfolio producing unit includes a price 15 of an emission right for carbon dioxide in the portfolio; and

the best portfolio proposing unit judges the best portfolio which can maximize the profit while maintaining the risk in the profit of electricity sale in 20 a certain period within the tolerance among the reorganized portfolios which are including the price of the emission right of carbon dioxide.

4. The power trading risk management system according to claim 1, further comprising:

25 an estimation of future electricity demand unit for estimating fluctuations of future electricity demand according to past electricity demand fluctuations; and
the system wherein

the portfolio producing unit includes a 30 financial product related to a weather in a corresponding

region in the portfolio; and

the best portfolio proposing unit judges the best portfolio which can maximize the profit while maintaining the risk in the profit of electricity sale in
5 a certain period within the tolerance among the reorganized portfolios which are including the financial product related to the weather.

5. The power trading risk management system according to claim 1, wherein

10 the risk evaluating unit manages a position and calculates a risk index for the electricity portfolio by use of the relationship between demand and price which varies depending on a country, a region, and time wherein the system is operated.

15 6. The power trading risk management system according to claim 5, wherein

the risk evaluating unit uses at least any of volatility, risk sensitivity, skewness of a rate of return distribution, kurtosis of the rate of return distribution,
20 a percent point of the rate of return distribution, a percent point of a price distribution, a value at risk and an earning at risk for managing the position and calculating the risk index for the electricity portfolio.

7. The power trading risk management system
25 according to any one of claims 1 to 6 wherein

the risk evaluating unit uses a probability distribution different from a normal distribution as a distribution of the rate of return attributable to a power trading upon risk evaluation of the portfolio.

30 8. The power trading risk management system

according to any one of claims 1 to 6, wherein

the risk evaluating unit uses a probability distribution different from a normal distribution that is calculated from a financial Boltzmann model as a
5 distribution of the rate of return attributable to a power trading upon risk evaluation of the portfolio.

9. A power trading risk management system, comprising:

10 a power generation risk parameter evaluating unit for simulating a fluctuation of a profit of each power plant and evaluating a risk parameter of power generation by use of a fluctuation of a fuel price;

15 an electricity procurement risk parameter evaluating unit for evaluating a risk parameter of electricity to be procured from a power trading market;

an electricity demand risk parameter evaluating unit for evaluating a risk parameter of an electricity contract with each customer;

20 a portfolio producing unit for producing a portfolio according to a proportion of electricity to be generated by owned power plants and electricity to be procured from a power trading market, the risk parameter of power generation, the risk parameter of electricity procurement and the risk parameter of electricity contract;

25 a risk value evaluating unit for evaluating a risk of the portfolio;

30 a portfolio reorganizing unit for reorganizing the portfolio by adjusting the proportion of the electricity to be generated by owned power plants and electricity to be procured from the market to maximize a profit while

maintaining the risk amount within a tolerance; and

an outputting means for deciding the proportion of the electricity to be procured from the market which can maximize the profit while maintaining the risk amount within the tolerance as an optimum combination and outputting the optimum combination as a power generation plan.

10. The power trading risk management system according to claim 9, further comprising:

10 means for deciding a combination of power generators to be operated to maximize a profit accrued from power generation.

11. The power trading risk management system according to claim 9, wherein

15 the risk value evaluating unit uses an asset and liability management method of any of maturity ladder analysis, term gap analysis, and duration gap analysis for management of the portfolio.

12. A power trading risk managing method, comprising
20 the steps of:

producing an electricity procurement plan by combining electricity to be generated by one or plural owned power generators and electricity to be procured from a market;

25 producing a generation-procurement curve based on the electricity procurement plan;

producing a portfolio of electricity to be generated by owned power plants and electricity to be procured from a power trading market that is matching to the generation-
30 procurement curve;

evaluating a risk of the portfolio;
estimating a profit of electricity sale according to
the portfolio;

5 reorganizing the portfolio; and
judging a best portfolio which can maximize the
profit while maintaining the risk in the profit of
electricity sale in a certain period within a tolerance
among the reorganized portfolios.

13. A power trading risk managing method, comprising
10 the steps of:

simulating a fluctuation of a profit of each power
plant;

evaluating a risk parameter of power generation by
use of a fluctuation of a fuel price;

15 evaluating a risk parameter of electricity to be
procured from a power trading market;

evaluating a risk parameter of an electricity
contract with each customer;

producing a portfolio according to a proportion of
20 electricity to be generated by owned power plants and
electricity to be procured from a power trading market,
the risk parameter of power generation, the risk parameter
of electricity procurement and the risk parameter of
electricity contract;

25 evaluating a risk of the portfolio;

reorganizing the portfolio by adjusting the
proportion of the electricity to be generated by owned
power plants and electricity to be procured from the
market to maximize a profit while maintaining the risk
30 amount within a tolerance;

deciding the proportion of the electricity to be procured from the market which can maximize the profit while maintaining the risk amount within the tolerance as an optimum combination; and

- 5 outputting the optimum combination as a power generation plan.